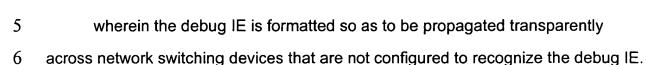
CLAIMS

What is claimed is:

1	1/	A method for diagnosing a failure in a network switching device comprising:
2		receiving a data packet containing a debug information element (IE) at the
3	network switching device;	
4		extracting the debug IE from the data packet;
5		performing at least one diagnostic function on the network switching device in
6	response to information contained in the debug IE.	
1	2.	The method of Claim 1, further comprising communicating results of said at
2	least one diagnostic function from the network switching device to a selected end	
3	point connected to the network switching device via a communications link.	

- 1 3. The method of Claim 1, wherein the debug IE is embedded in a connection-2 management message.
- 1 4. The method of Claim 1, wherein the debug IE is formatted so as to be 2 propagated transparently across network switching devices that are not configured
- 3 to recognize the debug IE.
- A method for diagnosing a failure in a network switching device comprising:
 embedding a debug information element (IE) in a message;
 receiving results of at least one failure diagnostic function from a network
- 4 switching device configured to respond to the debug IE,



- 1 6. The method of Claim 5, wherein the debug IE is embedded in a connection-
- 2 management message.
- 1 7. The method of Claim 5, wherein the debug IE includes information specifying
- 2 a network switching device on which the failure diagnostic function is performed.
- 1 8. The method of Claim 1, wherein the debug IE includes information identifying
- 2 said at least one failure diagnostic function.
- 1 9. A method for diagnosing a failure in a connection establishment path
- 2 comprising a plurality of nodes in a communication network, comprising:
- 3 embedding a debug information element (IE) in a data packet;
- 4 propagating the data packet to a plurality of switching devices corresponding
- 5 to respective nodes along the connection path;
- 6 extracting the debug IE at selected switching devices among said plurality of
- 7 switching devices; and
- 8 performing at least one diagnostic function on targeted switching devices
- 9 among said selected switching devices.
- 1 10. The method of Claim 9, wherein the debug IE is embedded in a connection-
- 2 management message.

- 1 11. The method of Claim 9, wherein the communication's network comprises a
- 2 plurality of ATM switching devices.
- 1 12. The method of Claim 9, wherein the debug IE includes information specifying
- 2 the targeted switching devices.
- 1 13. The method of Claim 9, wherein the debug IE includes information identifying
- 2 said at least one failure analysis function to be performed.
- 1 14. The method of Claim 9, wherein the selected switching devices correspond to
- 2 switching devices supplied by a particular vendor.
- 1 15. The method of Claim 14, wherein the debug IE is encoded in the data packet
- 2 such that it is passed along or dropped by switching devices along the
- 3 communication path that are not supplied by the particular vendor.
- 1 16. The method of Claim 9, further comprising communicating results of said at
- 2 least one failure analysis function from the targeted switching devices to an operator
- 3 of the targeted switching devices or the communication network.
- 1 17. The method of Claim 16, wherein the results from said at least one failure
- 2 analysis function are communicated to the operator of said targeted switching
- 3 devices by passing the results to a data station.



- 1 18. The method of Claim 17, wherein the results are passed to the data station
- 2 via at least one communication link that connects at least one of the targeted
- 3 switching device(s) to the data station.
- 1 19. The method of Claim 17, wherein the results are passed to the data station
- 2 by passing information from at least one of the targeted switching devices to another
- 3 switching device along the connection path, said another switching device passing
- 4 the results to the data station.
- 1 20. The method of Claim 9, wherein said targeted switching devices comprise
- 2 switching devices along a specific portion of the connection path.
- 1 21. The method of Claim 9, wherein said targeted switching devices comprise
- 2 switching devices that are members of a logical peer group in an ATM hierarchy.
- 1 22. The method of Claim 9, wherein the network comprises a PNNI (Private
- 2 Network-Network Interface) network.
- 1 23. The method of Claim 9, further comprising:
- 2 identifying said plurality of switching devices comprising the communications
- 3 path;

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- 4 identifying a switching device along the communications path corresponding
- 5 to a failure point in the communications path;
- 6 forwarding the message from switching device to switching device along the
- 7 communication path until it reaches the switching device corresponding to the failure
- 8 point; and

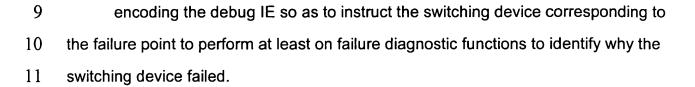
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- An article of manufacture comprising a computer-readable medium having computer-executable instructions for performing the functions of:
 receiving a data packet containing a debug information element (IE);
 extracting the debug IE from the data packet;
 performing at least one diagnostic function on a network switching device in response to information contained in the debug IE.
- The article of manufacture of claim method of Claim 13, wherein the computer-executable instructions further perform the function of communicating results of said at least one diagnostic function from the network switching device to a selected end point connected to the network switching device via a communications link.
 - 26. An article of manufacture comprising a computer-readable medium having computer-executable instructions for performing the functions of:
 - generating a debug information element (IE) having a format so that it may be propagated transparently across a network of switching devices that are not configured to recognize the debug IE.
- 6 embedding the debug IE in a message; and
- receiving results of at least one failure diagnostic function from a network switching device configured to respond to the debug IE.

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- 1 27. The article of manufacture of Claim 26, wherein the debug IE is embedded in
- 2 a connection-management message.
- 1 28. The article of manufacture of Claim 26, wherein the debug IE includes
- 2 information specifying a network switching device on which the failure diagnostic
- 3 function is performed.